

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A cleaning apparatus of a high-density plasma chemical vapor deposition chamber, comprising:

a chamber formed with a closed space therein, said chamber including a vertical sidewall;

an upper electrode provided in an upper portion of the chamber and applied with radio frequency energy;

a lower electrode provided below the upper electrode and applied with radio frequency energy;

a chuck provided below the upper electrode and formed thereon with the lower electrode to fix a wafer thereon; and

at least three cleaning gas nozzles provided at regular intervals on a said vertical sidewall of the chamber around the chuck, said cleaning gas nozzles extending perpendicularly from said vertical sidewall.

2. (Original) The apparatus of claim 1, wherein at least one cleaning gas nozzle is bent toward an upper center of the chamber relative to an upper surface of the chuck.

3. (Original) The apparatus as claimed in claim 2, wherein each cleaning gas nozzle is bent toward an upper center of the chamber relative to an upper surface of the chuck.

4. (Original) The apparatus as claimed in claim 1, wherein at least one cleaning gas nozzle is bent in a spiral form toward a center portion of the chamber and in a direction from a lower portion to an upper portion relative to an upper surface of the chuck.

5. (Original) The apparatus as claimed in claim 1, wherein the cleaning gas is NF_3 .

Claims 6-9. (Canceled)

10. (Currently Amended) A cleaning apparatus of a high-density plasma chemical vapor deposition chamber, comprising:

a chamber formed with a closed space therein, said chamber including a vertical sidewall;

an upper electrode provided in an upper portion of the chamber and applied with radio frequency energy;

a lower electrode provided below the upper electrode and applied with radio frequency energy;

a chuck provided below the upper electrode and formed thereon with the lower electrode to fix a wafer thereon;

a plurality of process gas nozzles disposed on a said vertical sidewall of the chamber for providing a process gas into the chamber; and

at least three cleaning gas nozzles disposed at regular intervals on the said vertical sidewall of the chamber spaced apart laterally from the chuck for providing a cleaning gas into the chamber, said cleaning gas nozzles extending perpendicularly from said vertical sidewall,

wherein the cleaning gas nozzles are all disposed below the process gas nozzles in the chamber.

11. (New) The apparatus of claim 10, wherein at least one cleaning gas nozzle is bent toward an upper center of the chamber relative to an upper surface of the chuck.

12. (New) The apparatus as claimed in claim 10, wherein each cleaning gas nozzle is bent toward an upper center of the chamber relative to an upper surface of the chuck.

13. (New) The apparatus as claimed in claim 10, wherein at least one cleaning gas nozzle is bent in a spiral form toward a center portion of the chamber and in a direction from a lower portion to an upper portion relative to an upper surface of the chuck.